

The Speed of Sound and Derived Thermodynamic Properties of Mixtures of n-Hexane and n-Hexadecane at Pressures up to 100 MPa

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The speed of sound has been measured in n-hexane, n-hexadecane and in four mixtures of these components at pressures up to the lower of the freezing pressure and 100 MPa, and at temperatures between 263.15 K and 473.15 K. A few measurements were also made at higher pressures up to 200 MPa. The measurements were performed by means of a dual-path pulse-echo technique operating at a frequency of 5 MHz. The estimated uncertainty of the speeds of sound is 0.05 per cent. In addition, the density and isobaric specific heat capacity has been measured for each system at a pressure of 0.1 MPa. Thermodynamic properties of the pure components and the binary mixtures have been obtained by numerical integration of the speed of sound starting from initial values of density and isobaric specific heat capacity specified on the isobar at 0.1 MPa. The properties obtained include density, specific heat capacity, compressibility, enthalpy and entropy increments and, for the mixtures, excess properties. Some of these quantities will be compared with available thermodynamic models. The uncertainty of the derived results has been studied in detail.